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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,266	11/03/2003	Josef Wiesinger	0127-085P/JAB	3687

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EXAMINER	
ROBERTS, JESSICA M	

ART UNIT	PAPER NUMBER
2621	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/700,266	WIESINGER ET AL.	
	Examiner	Art Unit	
	JESSICA ROBERTS	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6, 8-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement of Amendments

The amendment filed on 03/03/2008 overcomes the following rejection(s)/objection(s):

The objection of claim 10 for having minor informalities has been withdrawn in view of applicant's amendment.

Response to Arguments

1. Applicant's arguments with respect to claims 1-6 and 8-13 and have been considered but are moot in view of the new ground(s) of rejection.

2. As to applicants argument in regards to Fair does not use or suggest, pose estimation, but uses ranging data and the robots pitch/orientation data to operate.

3. The examiner respectfully disagrees.

4. Pose estimation is used to identify a specific objects and to determine the position and orientation relative to a coordinate system. Fair discloses to a technique for detecting the top and bottom of a staircase to allow automated descents and ascent of staircases. Additionally, the detection algorithm allows the robot to easily align itself with the stairwell, see introduction. Further, in order to verify that it has indeed faced a staircase and not a wall, the robot tilts its laser up and down the staircase, calculating the average gradient directly ahead. If this matches an acceptable staircase, with an angle between 20 and 65 degrees, the robot accepts the situation and moves to the next step, see ascent. Therefore, it is apparent to the examiner that Fair more than fairly

suggest the use of pose estimation with a staircase model, as it would be necessary for the for the robot to negotiate staircases, see staircase negation and table 1 and fig. 1-3.

5. As applicant arguments, pg 6 paragraph 3. The reference relied upon more than fairly suggest and teach the limitations as illustrated in the claim language. Further the reference more than adequately teach a monitoring system for the detection of obstacles and persons with the use of staircase pose estimation.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1,10, and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. As to claim 1, 10, and 12, it is unclear as to what is to be considered a geometric invariant.

9. Claims 2-6, and 8-13 fail to remedy the situation stated above, thus claims 2-6, 8-9,11, and 13 are also rejected as being indefinite.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claims 1-2 , 4-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ponsot et al., US- 6, 606,538 in view of Konolige et al., US 2005/0100207A1 and further in view of Fair et al., *Automated Staircase Detection, Alignment & Traversal.*

Re **claim 1**, Ponsot teaches a monitoring system (figs. 1-2) for the detection a person or object within a detection zone of an escalator (col. 3, lines 42-56) comprising at least one video camera (5-9) and at least one escalator and/or moving walk (1) for acquiring a plurality of images. Since Ponsot discloses the detection of persons or objects from in a detection zone, it would be inherent to segment the images into an escalator background and an obstacles and persons foreground; which is evident by Ponsot disclosing detecting the presence of persons or objects in a detecting zone (column 1 line 58-66). The cameras **5** to **9** are connected to a monitoring device **10** to which they transmit video images of the respective zones they cover. The monitoring device is designed to respond to the images transmitted by the cameras **5** to **9** to determine whether an object or person is to be found in the detection zone (column 3 line 50-56). Ponsot is silent in regards to a model based staircase pose estimator, acquires stereoscopic images; and determines differences in a rectified stereo images

pair which are segmented into an escalator background and an obstacles and persons foreground. However, Ponsot fails to teach acquiring stereoscopic images as claimed and determining the differences in rectified stereo image pair. And measuring the pixel difference between warped and unwarped images wherein image differences are represented in an image pyramid. It is noted however that the system and process for acquiring stereoscopic images is notoriously well known and used in the art for depth perception to enhance image detection as evidence by Konolige. Konolige discloses the two images to be correlated may come either from two different cameras separated spatially that capture images at the same time ([0002], [0014], [0015], [0017], [0058], [0059], and fig. 1). Konolige discloses a disparity map calculator connected to the output of the stereo correlation means, for calculating a disparity map of the object scene ([0019]). It should be noted that disparity is the difference of two images that have been positioned or overlaid on top of one another in stereoscopic or stereovision. Further disclosed are Laplacian image pyramids are built and disparity maps are produced ([0018]). Further, disclosed is an output at which digital representations of pixels in the first video image appear; a second digitizer for digitizing the second video image having an input connected to an output of the second video camera, and having an output at which digital representations of pixels in the second video image appear; a video processor for successively producing sequential stereo Laplacian pyramid images at left and right stereo outputs thereof from the digital representations of the first and second video images at first and second inputs connected to the outputs of the first and second digitizers [0019]. Therefore, it is clear to the examiner that Konolige discloses to

represent images in an image pyramid from the difference of two images, which reads upon the claimed limitation.

One aspect of the pyramid method is progressive compression, which the decoder inputs the compressed stream section by section, and each section improves the appearance of the image; which would also rectify the image. The examiner takes the position that rectification is just the adjustment of images to simplify stereoscopic images. Konolige also discloses the use of rectification for images that due to lighting biases that differ between the images, distortions introduced by the lenses, and image plane geometry. Compensation for geometric distortion is possible by rectifying the original images, by mapping the original image into a warped image ([0078]). Also, Konolige discloses the use of sub-pixel mapping between the rectified and original image ([0086] and [0087]). The examiner takes the position that in order for the method as disclosed by Konolige to compute sub-pixel mapping between the rectified image and the original image, it would necessitate the comparing and determining the differences of the rectified image.

However, the combination of Ponsot and Konolige are silent in regards to a model based staircase pose estimator based upon grouping of line features by the use of geometric invariant; and segmenting into a staircase background and obstacle foreground. However, Miller discloses a technique for detecting the top and bottom of a staircase to allow automated descents and ascents of staircases (see introduction) as well as stair negotiation. Further, in order to verify that it has indeed faced a staircase and not a wall, the robot tilts its laser up and down the staircase, calculating the average

gradient directly ahead. If this matches an acceptable staircase, with an angle between 20 and 65 degrees, the robot accepts the situation and moves to the next step, see ascent. Therefore, it is apparent to the examiner that Fair more than fairly suggest the use of pose estimation with a staircase model to detect background and foreground, see fig. 3, as it would be necessary for the for the robot to negotiate staircases, see staircase negation and table 1 and fig. 1-3.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Ponsot and Konolige with the teachings of Miller for providing position and orientation of objects or persons within the detection zone as wells a providing a more intelligent and robust layer of control that can plan ahead, bringing safety and efficient to the task of climbing stairs (see introduction).

Re **claim 2**, the combination of Ponsot, Konolige and Fair as a whole teaches everything as claimed above, **see claim 1.** In addition, Ponsot further teaches the video cameras are located above the escalator and/or moving walk (Ponsot, fig. 1).

Re **claim 4**, the combination of Ponsot, Konolige, and Fair teaches everything as claimed above, **see claim 1.** In addition, Ponsot further teaches more than one pair of video cameras are arranged along the escalator (moving staircase) and/or moving walk to monitor a full length (entire detection zone which includes all of the moving staircase) of the escalator and/or moving walk (Ponsot col. 3 line 44-49 also fig. 1).

Re **claim 5**, the analysis and rejection for claim 1 also apply here. Specially, Ponsot fails to further teach a processing unit for processing the stereoscopic images.

However, Ponsot does teach the monitoring system comprising a processing unit for processing a plurality of images and acquiring images on a moving escalator (column 3 lines 42-56 and fig. 1). Konolige discloses acquiring stereoscopic images (stereo vision, [0004], [0005], 0014], [0015] and fig. 1), and a signal processing unit (fast DSP processor, [0033] and 84) for processing stereoscopic images.

Therefore, the combined teaching of Ponsot and Konolige as a whole would have rendered obvious to one of ordinary skill in the art at the time the invention was made to acquiring and signal processing stereoscopic from the plurality of images as claimed for the benefit of depth perception to enhance image detection as taught by Konolige.

Re **claim 6,** the combination of Ponsot, Konolige and Fair teach everything as claimed above, see **claim 5.** In addition, Ponsot further teaches the monitoring system further comprises a data exchange bus for linking the video cameras with the processing unit (column 4 line 17-30, fig. 2: 14, 15) and means for storing the stereoscopic images (Ponsot, column 4 line 1-6, 21-24 and fig. 3).

Re **claim 8**, the combination of Ponsot, Konolige and Fair as a whole further teaches everything as claimed above, see **claim 5.** Further, Ponsot further teaches the processing unit is integrated with at least one camera (Ponsot, col. 8 line 52-56 and fig. 2).

Re **claim 9**, the combination of Ponsot, Konolige and Fair as a whole further teaches everything as claimed above, see **claim 5.** Further, Ponsot further teaches the monitoring system is connected electrical to a control for restarting the escalator and/or

moving walk after a stop only when no obstacle and/or person is detected on the escalator and/or moving walk (Ponsot, col. 2 line 19-23, col. 3 line 56-52, and col. 9 line 3-6, i.e. switching the unavailability of failure signal of the monitoring device).

Re **claims 10-11**, the analysis and rejection made in claims 1-9 also apply here. The combination of Ponsot and Konolige as a whole teaches a processor-based system. Hence, a computer program product for executing the necessary steps corresponding to the system of claim 1 would have been inherent.

Re **claims 12-13**, which recite a corresponding method to the monitoring system of claims 1-9. Thus, the analysis and rejection made in claims 1-9 also apply here because the monitoring system in claims 1-9 would have necessarily performed the method steps in claim 12.

In further regards to **claim 13**, the combination of Ponsot and Konolige teaches restarting the escalator and/or moving walk automatically (Ponsot, col. 4 line 9-16; in Ponsot, the main function of the processor is to receive the images coming from the cameras, to process the images in order to determine whether or not persons or objects are present in the detection zone and as a function of the presence or absence of persons or objects in the detection zone to generate command signals for controlling the staircase, which signals are to be applied to the control device after a stop only when no obstacle and/or person is detected on the escalator and/or moving walk).

Claim 3 is rejected under 35 U.S.C 103(a) as being unpatentable over Ponsot et al., US6, 606,538 in view of Konolige et al., US- 2005/0100207A1 and further in view of as applied to claim 1 above and further view of Ahl et al., US-5, 704,464.

Re **claim 3,** the combination of Ponsot and Konolige fails to teach the monitoring system characterized in that the video cameras are located in a balustrade of the escalator and/or moving walk. Ahls discloses a passenger sensor (fig. 2:32) for a convey or includes a transmitter assembly that is positioned within a channel in the conveyor or balustrade (fig 2:22). Therefore, the combined teachings of Ponsot, Konolige and Ahls et al, as a whole would have rendered obvious to one of ordinary skill in the art at the time the invention was made to modify the arrangement of using a monitoring system located in the balustrade as claimed for the benefit to determine the presence of a passenger.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSICA ROBERTS whose telephone number is

(571)270-1821. The examiner can normally be reached on 7:30-5:00 EST Monday-Friday, Alt Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha D. Banks-Harold can be reached on (571) 272-7905. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Marsha D. Banks-Harold/
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